# C

# ASCII CHARACTER SET AND ANSI.SYS

ASCII (American Standard Code for Information Interchange) is a coding system that is used by personal computers to store character data, such as letters of the alphabet, numerals, some symbols, and certain control characters. There are 128 characters defined by the standard ASCII character set. Each ASCII character is assigned an 8-bit code that converts to a decimal number from 0 to 127. The first 31 values, which are non-printable codes, are used for control characters and can be used to send commands to printers or other peripheral devices. Files that store data as ASCII characters are sometimes called ASCII files, ASCII text files, or simply text files. ASCII can be read by most editors and word processors and is considered the universal file format for personal computers. AUTOEXEC.BAT is one example of an ASCII file.

In addition to the standard ASCII character set, some manufacturers use an extended ASCII character set that is specific to their equipment and is not necessarily compatible with other computers. The extended ASCII character sets use the codes 128 through 255.

The American National Standards Institute (ANSI), an organization responsible for many computer standards, developed an extended character set using codes 128 through 255 that includes special characters such as letters in an international alphabet and accents, currency symbols, and fractions. ANSI also defined a series of control codes that can be used to control the monitor. For example, a sequence of control codes can clear the monitor, cause characters to display upside down, or put color on a DOS screen. ANSI.SYS is a device driver that, when loaded in a DOS environment, provides these monitor and keyboard functions. ANSI.SYS is loaded from the CONFIG.SYS file with this command:

```
DEVICE=C:\DOS\ANSI.SYS
```

Some DOS programs need ANSI.SYS loaded in order to interpret the extended character set entered from the keyboard, display these characters on the screen, and control the monitor in other ways.

The table below lists the standard ASCII character set. Note that items 2 through 32 are not included; these represent non–printable ASCII control characters that are used to communi–cate with peripheral devices.

**Table C-1**    Standard ASCII character set

| Item Number | Symbol | Meaning | ASCII in Decimal Representation | ASCII in Binary Representation | ASCII in Hex Representation |
|---|---|---|---|---|---|
| 1 | . | Null | 0 | 0000 0000 | 0 |
| 33 | b/ | Space | 32 | 0010 0000 | 20 |
| 34 | ! | Exclamation point | 33 | 0010 0001 | 21 |
| 35 | " | Quotation mark | 34 | 0010 0010 | 22 |
| 36 | # | Number sign | 35 | 0010 0011 | 23 |
| 37 | $ | Dollar sign | 36 | 0010 0100 | 24 |
| 38 | % | Percent sign | 37 | 0010 0101 | 25 |
| 39 | & | Ampersand | 38 | 0010 0110 | 26 |
| 40 | ' | Apostrophe, prime sign | 39 | 0010 0111 | 27 |
| 41 | ( | Opening parenthesis | 40 | 0010 1000 | 28 |
| 42 | ) | Closing parenthesis | 41 | 0010 1001 | 29 |
| 43 | * | Asterisk | 42 | 0010 1010 | 2A |
| 44 | + | Plus sign | 43 | 0010 1011 | 2B |
| 45 | , | Comma | 44 | 0010 1100 | 2C |
| 46 | - | Hyphen, minus sign | 45 | 0010 1101 | 2D |
| 47 | . | Period, decimal point | 46 | 0010 1110 | 2E |
| 48 | / | Slant | 47 | 0010 1111 | 2F |
| 49 | 0 | | 48 | 0011 0000 | 30 |
| 50 | 1 | | 49 | 0011 0001 | 31 |
| 51 | 2 | | 50 | 0011 0010 | 32 |
| 52 | 3 | | 51 | 0011 0011 | 33 |
| 53 | 4 | | 52 | 0011 0100 | 34 |
| 54 | 5 | | 53 | 0011 0101 | 35 |
| 55 | 6 | | 54 | 0011 0110 | 36 |
| 56 | 7 | | 55 | 0011 0111 | 37 |
| 57 | 8 | | 56 | 0011 1000 | 38 |
| 58 | 9 | | 57 | 0011 1001 | 39 |
| 59 | : | Colon | 58 | 0011 1010 | 3A |
| 60 | ; | Semicolon | 59 | 0011 1011 | 3B |

**Table C-1**   Standard ASCII character set (continued)

| Item Number | Symbol | Meaning | ASCII in Decimal Representation | ASCII in Binary Representation | ASCII in Hex Representation |
|---|---|---|---|---|---|
| 61 | < | Less than sign | 60 | 0011 1100 | 3C |
| 62 | = | Equal sign | 61 | 0011 1101 | 3D |
| 63 | > | Greater than sign | 62 | 0011 1110 | 3E |
| 64 | ? | Question mark | 63 | 0011 1111 | 3F |
| 65 | @ | Commercial at sign | 64 | 0100 0000 | 40 |
| 66 | A | | 65 | 0100 0001 | 41 |
| 67 | B | | 66 | 0100 0010 | 42 |
| 68 | C | | 67 | 0100 0011 | 43 |
| 69 | D | | 68 | 0100 0100 | 44 |
| 70 | E | | 69 | 0100 0101 | 45 |
| 71 | F | | 70 | 0100 0110 | 46 |
| 72 | G | | 71 | 0100 0111 | 47 |
| 73 | H | | 72 | 0100 1000 | 48 |
| 74 | I | | 73 | 0100 1001 | 49 |
| 75 | J | | 74 | 0100 1010 | 4A |
| 76 | K | | 75 | 0100 1011 | 4B |
| 77 | L | | 76 | 0100 1100 | 4C |
| 78 | M | | 77 | 0100 1101 | 4D |
| 79 | N | | 78 | 0100 1110 | 4E |
| 80 | O | | 79 | 0100 1111 | 4F |
| 81 | P | | 80 | 0101 0000 | 50 |
| 82 | Q | | 81 | 0101 0001 | 51 |
| 83 | R | | 82 | 0101 0010 | 52 |
| 84 | S | | 83 | 0101 0011 | 53 |
| 85 | T | | 84 | 0101 0100 | 54 |
| 86 | U | | 85 | 0101 0101 | 55 |
| 87 | V | | 86 | 0101 0110 | 56 |
| 88 | W | | 87 | 0101 0111 | 57 |
| 89 | X | | 88 | 0101 1000 | 58 |
| 90 | Y | | 89 | 0101 1001 | 59 |
| 91 | Z | | 90 | 0101 1010 | 5A |
| 92 | [ | Opening bracket | 91 | 0101 1011 | 5B |
| 93 | \ | Reverse slant | 92 | 0101 1100 | 5C |
| 94 | ] | Closing bracket | 93 | 0101 1101 | 5D |

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**Table C-1**    Standard ASCII character set (continued)

| Item Number | Symbol | Meaning | ASCII in Decimal Representation | ASCII in Binary Representation | ASCII in Hex Representation |
|---|---|---|---|---|---|
| 95 | ^ | Caret | 94 | 0101 1110 | 5E |
| 96 | __ | Underscore | 95 | 0101 1111 | 5F |
| 97 | ` | Acute accent | 96 | 0110 0000 | 60 |
| 98 | a | | 97 | 0110 0001 | 61 |
| 99 | b | | 98 | 0110 0010 | 62 |
| 100 | c | | 99 | 0110 0011 | 63 |
| 100 | d | | 100 | 0110 0100 | 64 |
| 102 | e | | 101 | 0110 0101 | 65 |
| 103 | f | | 102 | 0110 0110 | 66 |
| 104 | g | | 103 | 0110 0111 | 67 |
| 105 | h | | 104 | 0110 1000 | 68 |
| 106 | i | | 105 | 0110 1001 | 69 |
| 107 | j | | 106 | 0110 1010 | 6A |
| 108 | k | | 107 | 0110 1011 | 6B |
| 109 | l | | 108 | 0110 1100 | 6C |
| 110 | m | | 109 | 0110 1101 | 6D |
| 111 | n | | 110 | 0110 1110 | 6E |
| 112 | o | | 111 | 0110 1111 | 6F |
| 113 | p | | 112 | 0111 0000 | 70 |
| 114 | q | | 113 | 0111 0001 | 71 |
| 115 | r | | 114 | 0111 0010 | 72 |
| 116 | s | | 115 | 0111 0011 | 73 |
| 117 | t | | 116 | 0111 0100 | 74 |
| 118 | u | | 117 | 0111 0101 | 75 |
| 119 | v | | 118 | 0111 0110 | 76 |
| 120 | w | | 119 | 0111 0111 | 77 |
| 121 | x | | 120 | 0111 1000 | 78 |
| 122 | y | | 121 | 0111 1001 | 79 |
| 123 | z | | 122 | 0111 1010 | 7A |
| 124 | { | Opening brace | 123 | 0111 1011 | 7B |
| 125 | l | Split vertical bar | 124 | 0111 1100 | 7C |
| 126 | } | Closing brace | 125 | 0111 1101 | 7D |
| 127 | ~ | Tilde | 126 | 0111 1110 | 7E |
| 128 | Δ | Small triangle | 127 | 0111 1111 | 7F |